

WHAT IS CLAIMED IS:

- sub 17
1. A computer-readable medium having computer-executable instructions, comprising,
- receiving a document having an element thereon, the document including information associating the element with an external component that is external to the document;
- rendering a page image corresponding to at least part of the document, the page image including a representation of the element; and
- accessing the external component for determining a behavior of the representation of the element rendered on the page image.
2. The computer-readable medium of claim 1 further comprising, receiving an event, and accessing the external component in response to the event.
3. The computer-readable medium of claim 2 further comprising, modifying an appearance of the representation of the element.

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4. The computer-readable medium of claim 1 further comprising, changing a location of the representation of the element in response to accessing the external component.

5. The computer-readable medium of claim 1 further comprising, drawing information on the page image in response to accessing the external component.

6. The computer-readable medium of claim 1 wherein the external component comprises an object, and wherein accessing the external component includes instantiating an instance of the object.

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sub 7. The computer-readable medium of claim 1 further comprising, receiving a new document having another element thereon, the new document including information associating the element with the external component, rendering a new page image corresponding to at least part of the document, the new page image including a representation of the other element, and accessing the external component for determining a behavior of the representation of the other element rendered on the page image.

sub 8. The computer-readable medium of claim 7 wherein the external component comprises a COM object, and wherein accessing the external component for determining a behavior of

the representation of the other element includes accessing another instance of the object.

9. The computer-readable medium of claim 1 wherein the information associating the element with the external component is maintained in a cascading style sheet.

10. The computer-readable medium of claim 1 wherein the information associating the element with the external component is maintained in a custom tag.

11. The computer-readable medium of claim 1 wherein the information associating the element with the external component is maintained in a class.

12. The computer-readable medium of claim 1 wherein the information associating the element with the external component is maintained in the document inline with the element.

13. The computer-readable medium of claim 1 wherein the document includes another element having a representation thereof rendered in the page image, the document includes other information associating the other element with the

external component, and further comprising, accessing the external component for determining a behavior of the representation of the other element.

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K 14. The computer-readable medium of claim 1 wherein the document includes information associating the element with a second external component, and further comprising, accessing the second external component for determining a behavior of the representation of element.

15. The computer-readable medium of claim 14 further comprising, resolving a conflict between the behavior determined by the external component and the behavior determined by the second external component.

16. The computer-readable medium of claim 1 further comprising, downloading the external component.

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K 17. A method of providing dynamic effects to an HTML document, comprising the steps of, encapsulating code in an external component for affecting the behavior of elements, inserting an element into a document, attaching a reference in the document to associate the element with the external component, and providing the document to a renderer.

18. The method of claim 17 further comprising, providing the external component to the renderer.

19. The method of claim 17 further comprising, rendering a page image from the document, accessing the external component, and modifying a representation of the element based on the code in the external component.

20. The method of claim 19 wherein the external component is a COM object, and wherein accessing the external component includes calling an interface of the COM object.

21. The method of claim 19 wherein modifying a representation of the element includes changing the appearance thereof.

22. The method of claim 19 wherein modifying a representation of the element includes changing the location thereof.

23. The method of claim 17 further comprising, rendering a page image from the document, accessing the external

component, and drawing information in the image based on the code in the external component.

24. The method of claim 23 wherein rendering a page image from the document is interleaved with drawing information in the image.

25. The method of claim 17 further comprising receiving an event indicative of user interaction with the image.

26. The computer-readable medium of claim 17 wherein the reference associating the element with the external component is maintained in a cascading style sheet.

27. The computer-readable medium of claim 17 wherein the reference associating the element with the external component is maintained in a custom tag.

28. The computer-readable medium of claim 17 wherein the information associating the element with the external component is maintained in a class identifier.

29. The computer-readable medium of claim 17 wherein the reference associating the element with the external component is maintained inline with the element in the document.

30. In a computer system, a system for rendering page images on a display, comprising:

an external component encapsulating code for modifying the behavior of elements; and

a renderer connected to the display for rendering page images, the renderer receiving a document having an element specified therein and information associating the element with the external component, the renderer rendering a page image corresponding to the document and accessing the external component for modifying the page image.

31. The system of claim 30 further comprising a mechanism for receiving an event.

32. The system of claim 30 wherein the renderer displays a representation of the element and modifies a behavior of the element by accessing the external component.

33. The system of claim 32 wherein the behavior is modified by changing a displayed property of the representation of the element.

34. The system of claim 32 wherein the behavior is modified by changing a displayed location of the representation of the element.

35. The system of claim 30 wherein the renderer modifies the page image by accessing the external component, and the external component draws information on the page image.

36. The system of claim 35 wherein the renderer calls the external component a plurality of time to draw information on the page image, and the renderer draws information on the page image between at least some of calls to the external component.

37. The system of claim 30 wherein the external component comprises an object, and wherein the renderer instantiates an instance of the object.



38. The system of claim 30 wherein the external component comprises an object, and wherein the renderer communicates with the object through an interface.

39. The system of claim 30 wherein the renderer receives a new document having another element thereon that references the external component.

40. The system of claim 30 wherein the information associating the element with the external component is maintained in a cascading style sheet.

41. The system of claim 40 wherein the cascading style sheet is embedded in the document.

42. The system of claim 40 wherein the cascading style sheet is linked to the document.

43. The system of claim 30 including a custom tag for associating the element with the external component.

44. The system of claim 30 wherein the information associating the element with the external component is maintained in the document inline with the element.

45. The system of claim 30 wherein the document includes another element and information associating the other element with the external component, and wherein the renderer accesses the external component for determining a behavior of the representation of the other element.

46. The system of claim 30 wherein the document includes information associating the element with a second external component.

47. The system of claim 30 wherein the renderer accesses the external component to control the format of data input by a user.